SEQUENCE LISTING

<110> CASTANIA Sociedade Agroflorestal SA

<120> Castanea sativa Mill. genes codifying for Allene Oxide Cyclase, Cystatin, ß-1,3-Glucanase and Thaumatin-Like Protein and their use

<130> 1

<140>

<141> 2004-06-07

<150> PT 102979-S
<151> 2003-06-26

<160> 8

<170> PatentIn version 3.1

<210> 1

<211> 735

<212> DNA

<213> Castanea sativa

<400> 1

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atg gcc act gtt tcc tca gcc tct gct gct ctt aga acc att tct tct       48
Met Ala Thr Val Ser Ser Ala Ser Ala Ala Leu Arg Thr Ile Ser Ser
1               5                   10                  15

tcc tca tcc aag cta tct tct gcc ttc caa act aaa aag atc caa tct       96
Ser Ser Ser Lys Leu Ser Ser Ala Phe Gln Thr Lys Lys Ile Gln Ser
            20                  25                  30

ttt aaa cta cct aac cct ctc att tct cag aat cat aaa ctt act acc      144
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Phe Lys Leu Pro Asn Pro Leu Ile Ser Gln Asn His Lys Leu Thr Thr
        35                  40                  45

acc tct act act gct tcc aga tca ttt tcc tgc aag agc cag agc acc      192
Thr Ser Thr Thr Ala Ser Arg Ser Phe Ser Cys Lys Ser Gln Ser Thr
    50                  55                  60

tca aca gat tca act aac act gaa gtt caa gaa ctt agt gtc tat gag      240
Ser Thr Asp Ser Thr Asn Thr Glu Val Gln Glu Leu Ser Val Tyr Glu
65                  70                  75                  80

atc aat gaa cgt gat cgt gga agc cct gct tat ctt cga ttg agc caa      288
Ile Asn Glu Arg Asp Arg Gly Ser Pro Ala Tyr Leu Arg Leu Ser Gln
                85                  90                  95

aag act gtt aat tca ctc gga gat ctt gtc ccc ttt agc aac aag cta      336
Lys Thr Val Asn Ser Leu Gly Asp Leu Val Pro Phe Ser Asn Lys Leu
            100                 105                 110

tat act gca gat cta aag aag aga att gga ata aca gca gga ctc tgc      384
Tyr Thr Ala Asp Leu Lys Lys Arg Ile Gly Ile Thr Ala Gly Leu Cys
        115                 120                 125

att ctg atc aag cac gaa gaa gag aag aaa gga gat cgc tat gaa gct      432
Ile Leu Ile Lys His Glu Glu Glu Lys Lys Gly Asp Arg Tyr Glu Ala
    130                 135                 140

gtt tac agc ttc tac ttc ggc gat tac ggt cat atc gcc gtt cag gga      480
Val Tyr Ser Phe Tyr Phe Gly Asp Tyr Gly His Ile Ala Val Gln Gly
145                 150                 155                 160

gcg tac tta acc tat gaa gaa act tac cta gcc gtc acc ggt gga tcc      528
Ala Tyr Leu Thr Tyr Glu Glu Thr Tyr Leu Ala Val Thr Gly Gly Ser
                165                 170                 175

ggc ata ttt gca ggg gtt tcc ggt caa gtg aaa ttg cag caa ctc att      576
Gly Ile Phe Ala Gly Val Ser Gly Gln Val Lys Leu Gln Gln Leu Ile
            180                 185                 190

ttc cct ttc aag cta ttt tac act ttt tac ttg aag ggg atc ccc ggt      624
Phe Pro Phe Lys Leu Phe Tyr Thr Phe Tyr Leu Lys Gly Ile Pro Gly
        195                 200                 205

ctg cca tct gaa ttg ttg tgt acg gcg gtt cct ccg tcg ccg acg gtg      672
Leu Pro Ser Glu Leu Leu Cys Thr Ala Val Pro Pro Ser Pro Thr Val
    210                 215                 220

gag cca aca cct gaa gct aaa gct tgt gag gaa ggg gcc gca ctg aaa      720
Glu Pro Thr Pro Glu Ala Lys Ala Cys Glu Glu Gly Ala Ala Leu Lys
225                 230                 235                 240

aat tac act aat taa                                                 735
Asn Tyr Thr Asn
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<210> 2

<211> 244

<212> PRT

<213> Castanea sativa

<400> 2

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Met Ala Thr Val Ser Ser Ala Ser Ala Ala Leu Arg Thr Ile Ser Ser
1               5                   10                  15

Ser Ser Ser Lys Leu Ser Ser Ala Phe Gln Thr Lys Lys Ile Gln Ser
            20                  25                  30

Phe Lys Leu Pro Asn Pro Leu Ile Ser Gln Asn His Lys Leu Thr Thr
        35                  40                  45

Thr Ser Thr Thr Ala Ser Arg Ser Phe Ser Cys Lys Ser Gln Ser Thr
    50                  55                  60

Ser Thr Asp Ser Thr Asn Thr Glu Val Gln Glu Leu Ser Val Tyr Glu
65                  70                  75                  80

Ile Asn Glu Arg Asp Arg Gly Ser Pro Ala Tyr Leu Arg Leu Ser Gln
                85                  90                  95

Lys Thr Val Asn Ser Leu Gly Asp Leu Val Pro Phe Ser Asn Lys Leu
            100                 105                 110

Tyr Thr Ala Asp Leu Lys Lys Arg Ile Gly Ile Thr Ala Gly Leu Cys
        115                 120                 125

Ile Leu Ile Lys His Glu Glu Glu Lys Lys Gly Asp Arg Tyr Glu Ala
    130                 135                 140

Val Tyr Ser Phe Tyr Phe Gly Asp Tyr Gly His Ile Ala Val Gln Gly
145                 150                 155                 160

Ala Tyr Leu Thr Tyr Glu Glu Thr Tyr Leu Ala Val Thr Gly Gly Ser
                165                 170                 175

Gly Ile Phe Ala Gly Val Ser Gly Gln Val Lys Leu Gln Gln Leu Ile
            180                 185                 190
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Phe Pro Phe Lys Leu Phe Tyr Thr Phe Tyr Leu Lys Gly Ile Pro Gly
        195                 200                 205

Leu Pro Ser Glu Leu Leu Cys Thr Ala Val Pro Pro Ser Pro Thr Val
    210                 215                 220

Glu Pro Thr Pro Glu Ala Lys Ala Cys Glu Glu Gly Ala Ala Leu Lys
225                 230                 235                 240

Asn Tyr Thr Asn
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<210> 3

<211> 318

<212> DNA

<213> Castanea sativa

<400> 3

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atg aga aaa ttg gca gca cta gtt gga gga gtg tca gat gtt aag gga       48
Met Arg Lys Leu Ala Ala Leu Val Gly Gly Val Ser Asp Val Lys Gly
1               5                   10                  15

cat gag aac agc ttg cag atc gac gac ctc gct cgt ttt gct gtc gac       96
His Glu Asn Ser Leu Gln Ile Asp Asp Leu Ala Arg Phe Ala Val Asp
            20                  25                  30

gac cac aac aag aaa gcg aat aca ctg ctg cag ttt aag aag gtg gtg      144
Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
        35                  40                  45

aat gcg aaa cag cag gtg gtt tct gga aca ata tac att cta acg ttg      192
Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
    50                  55                  60

gag gtg gag gat ggc ggg aag aag aaa gtt tat gaa gcc aag att tgg      240
Glu Val Glu Asp Gly Gly Lys Lys Lys Val Tyr Glu Ala Lys Ile Trp
65                  70                  75                  80

gag aag cca tgg ttg aac ttc aag gag gtg cag gaa ttt aag ctc att      288
Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
                85                  90                  95

ggt gat gcc cct aca cac cat agt gct taa                             318
Gly Asp Ala Pro Thr His His Ser Ala
            100                 105
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<210> 4

<211> 105

<212> PRT

<213> Castanea sativa

<400> 4

Met Arg Lys Leu Ala Ala Leu Val Gly Gly Val Ser Asp Val Lys Gly
1 5 10 15

His Glu Asn Ser Leu Gln Ile Asp Asp Leu Ala Arg Phe Ala Val Asp
20 25 30

Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
35 40 45

Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
50 55 60

Glu Val Glu Asp Gly Gly Lys Lys Lys Val Tyr Glu Ala Lys Ile Trp
65 70 75 80

Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
85 90 95

Gly Asp Ala Pro Thr His His Ser Ala
100 105

<210> 5

<211> 927

<212> DNA

<213> Castanea sativa

<400> 5
atg aga atc tat gat ccg aat cag gct gtt cta caa gcc ctt aga ggc 48
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1               5                   10                  15

tct aac att gaa gtc atg cta ggt gtc cca aac tca gac ctt caa agc       96
Ser Asn Ile Glu Val Met Leu Gly Val Pro Asn Ser Asp Leu Gln Ser
            20                  25                  30

ctt gcc aac cct tcc aat gca caa gca tgg gta caa aga aac gta ctt      144
Leu Ala Asn Pro Ser Asn Ala Gln Ala Trp Val Gln Arg Asn Val Leu
        35                  40                  45

aac ttc tgg cct agt gtc agg ttt cga tac att gca gtt gga aat gaa      192
Asn Phe Trp Pro Ser Val Arg Phe Arg Tyr Ile Ala Val Gly Asn Glu
    50                  55                  60

gtg agt cct gtt aat gga ggc aca gct ggg tta gca caa att gtt ctc      240
Val Ser Pro Val Asn Gly Gly Thr Ala Gly Leu Ala Gln Ile Val Leu
65                  70                  75                  80

cct gcc tta acc aac gta ttc aat gca att aga tca gct ggc ctt aag      288
Pro Ala Leu Thr Asn Val Phe Asn Ala Ile Arg Ser Ala Gly Leu Lys
                85                  90                  95

gac caa atc cag gtt tca att gca att gac atg acc tta ata gga aac      336
Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn
            100                 105                 110

tcc tat cct ccg tca gca ggg gct ttc aga ggt gat gtt aga tca tat      384
Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr
        115                 120                 125

tta gac cca atc att ggt cac cta gta tat gct aag gca ccc tta cta      432
Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu
    130                 135                 140

gcc aat gtg tac act tat ttt agc tat gct gga aat cca cgc gac att      480
Ala Asn Val Tyr Thr Tyr Phe Ser Tyr Ala Gly Asn Pro Arg Asp Ile
145                 150                 155                 160

tct ctt ccc tat gct ttg ttt act tcc cca tca gtt gtg gca tgg gat      528
Ser Leu Pro Tyr Ala Leu Phe Thr Ser Pro Ser Val Val Ala Trp Asp
                165                 170                 175

ggt cct aag gga tac caa aac ctt ttt gat gca atg atg gat gca ttg      576
Gly Pro Lys Gly Tyr Gln Asn Leu Phe Asp Ala Met Met Asp Ala Leu
            180                 185                 190

tac tca gct ctc gag agg tcg tgg ggc ggt tca ttg gag gtt gtt gtt      624
Tyr Ser Ala Leu Glu Arg Ser Trp Gly Gly Ser Leu Glu Val Val Val
        195                 200                 205

tca gag agt gga tgg cca tca gca gca ggt gga ttc gct aca tca ttt      672
Ser Glu Ser Gly Trp Pro Ser Ala Ala Gly Gly Phe Ala Thr Ser Phe
    210                 215                 220

gat aat gca cgt act tat tac tca aat ttg att aag cat gtc aaa ggg      720
Asp Asn Ala Arg Thr Tyr Tyr Ser Asn Leu Ile Lys His Val Lys Gly
225                 230                 235                 240
```

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ggt aca cca aag agg cct ggg gga gct ata gag acc tat ctt ttt gcc      768
Gly Thr Pro Lys Arg Pro Gly Gly Ala Ile Glu Thr Tyr Leu Phe Ala
                245                 250                 255

atg ttt aat gag aat cag aaa caa cca gag cta gag aaa aac ttt ggc      816
Met Phe Asn Glu Asn Gln Lys Gln Pro Glu Leu Glu Lys Asn Phe Gly
            260                 265                 270

tta ttc ttc cca aat aaa cag ccc aaa ttt aac ctc aat ttt ggt gga      864
Leu Phe Phe Pro Asn Lys Gln Pro Lys Phe Asn Leu Asn Phe Gly Gly
        275                 280                 285

gaa aga atc tgg gat gtc act gct gaa tat aat gca aca gtt tcc ctc      912
Glu Arg Ile Trp Asp Val Thr Ala Glu Tyr Asn Ala Thr Val Ser Leu
    290                 295                 300

agt agt gat atg taa                                              927
Ser Ser Asp Met
305
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<210> 6

<211> 308

<212> PRT

<213> Castanea sativa

<400> 6

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Met Arg Ile Tyr Asp Pro Asn Gln Ala Val Leu Gln Ala Leu Arg Gly
1               5                   10                  15

Ser Asn Ile Glu Val Met Leu Gly Val Pro Asn Ser Asp Leu Gln Ser
            20                  25                  30

Leu Ala Asn Pro Ser Asn Ala Gln Ala Trp Val Gln Arg Asn Val Leu
        35                  40                  45

Asn Phe Trp Pro Ser Val Arg Phe Arg Tyr Ile Ala Val Gly Asn Glu
    50                  55                  60

Val Ser Pro Val Asn Gly Gly Thr Ala Gly Leu Ala Gln Ile Val Leu
65                  70                  75                  80

Pro Ala Leu Thr Asn Val Phe Asn Ala Ile Arg Ser Ala Gly Leu Lys
                85                  90                  95
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```
Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn
            100                 105                 110

Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr
        115                 120                 125

Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu
    130                 135                 140

Ala Asn Val Tyr Thr Tyr Phe Ser Tyr Ala Gly Asn Pro Arg Asp Ile
145                 150                 155                 160

Ser Leu Pro Tyr Ala Leu Phe Thr Ser Pro Ser Val Val Ala Trp Asp
                165                 170                 175

Gly Pro Lys Gly Tyr Gln Asn Leu Phe Asp Ala Met Met Asp Ala Leu
            180                 185                 190

Tyr Ser Ala Leu Glu Arg Ser Trp Gly Gly Ser Leu Glu Val Val Val
        195                 200                 205

Ser Glu Ser Gly Trp Pro Ser Ala Ala Gly Gly Phe Ala Thr Ser Phe
    210                 215                 220

Asp Asn Ala Arg Thr Tyr Tyr Ser Asn Leu Ile Lys His Val Lys Gly
225                 230                 235                 240

Gly Thr Pro Lys Arg Pro Gly Gly Ala Ile Glu Thr Tyr Leu Phe Ala
                245                 250                 255

Met Phe Asn Glu Asn Gln Lys Gln Pro Glu Leu Glu Lys Asn Phe Gly
            260                 265                 270

Leu Phe Phe Pro Asn Lys Gln Pro Lys Phe Asn Leu Asn Phe Gly Gly
        275                 280                 285

Glu Arg Ile Trp Asp Val Thr Ala Glu Tyr Asn Ala Thr Val Ser Leu
    290                 295                 300

Ser Ser Asp Met
305
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<210> 7

<211> 732

<212> DNA

<213> Castanea sativa

<400> 7

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atg aaa acc ctg gca ctc tac ggc ctt acc ttg gcc ttc ttt ttc tta       48
Met Lys Thr Leu Ala Leu Tyr Gly Leu Thr Leu Ala Phe Phe Phe Leu
1               5                   10                  15

tct ggt gca cac tct gct aaa ata act ttc aca aac aac tgt cca aga       96
Ser Gly Ala His Ser Ala Lys Ile Thr Phe Thr Asn Asn Cys Pro Arg
            20                  25                  30

acc atc tgg cca gga acc cta act tcg gat caa aaa cct caa ctt tca      144
Thr Ile Trp Pro Gly Thr Leu Thr Ser Asp Gln Lys Pro Gln Leu Ser
        35                  40                  45

aaa act gga ttt gag tta gca tcc aaa gca tcc tta aca ttg gaa tgt      192
Lys Thr Gly Phe Glu Leu Ala Ser Lys Ala Ser Leu Thr Leu Glu Cys
    50                  55                  60

tca agc tcc atg gaa agg ccg gtt ttg ggc ccg aac ccg atg cac cac      240
Ser Ser Ser Met Glu Arg Pro Val Leu Gly Pro Asn Pro Met His His
65                  70                  75                  80

caa atc agg aaa gtt cac ttg cga gac tgc tga ttg tag cac cgg tca      288
Gln Ile Arg Lys Val His Leu Arg Asp Cys     Leu     His Arg Ser
                85                  90

ggt tgc atg caa tgg taa cgg tgc aat ccc acc agc ttc ttt agt aga      336
Gly Cys Met Gln Trp     Arg Cys Asn Pro Thr Ser Phe Phe Ser Arg
95                  100                 105

aat caa cat agc agc caa tcg tgg gat gga cta tta tga tgt tag cct      384
Asn Gln His Ser Ser Gln Ser Trp Asp Gly Leu Leu     Cys     Pro
110                 115                 120

tgt aga tgg ctt caa ctt gcc tgt ttc tgt agc cac cag agg cgg cac      432
Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys Ser His Gln Arg Arg His
    125                 130                 135

tgg tga ttg caa ggc cac aag ctg tcc agc taa tgt gaa cgc agt ttg      480
Trp     Leu Gln Gly His Lys Leu Ser Ser     Cys Glu Arg Ser Leu
140                 145                     150

ccc agc gga att aca agt gaa agg gtc tga tgg gag cgt gct tgc ttg      528
Pro Ser Gly Ile Thr Ser Glu Arg Val     Trp Glu Arg Ala Cys Leu
    155                 160                 165

caa gag cgc ttg tat tgc ttt caa tca acc aca gta ctg ttg cac tgg      576
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Gln Glu Arg Leu Tyr Cys Phe Gln Ser Thr Thr Val Leu Leu His Trp
    170                 175                 180

tgc att taa cac ccc gaa aac atg tcc acc cac aaa ata ttc tcg cat      624
Cys Ile     His Pro Glu Asn Met Ser Thr His Lys Ile Phe Ser His
185                     190                 195

ctt taa gca aca atg tcc tca agc tta tag cta tgc tta tga tga tcc      672
Leu     Ala Thr Met Ser Ser Ser Leu     Leu Cys Leu         Ser
200                     205                 210

tac cag cac ctt tac ctg ctc aag tgc acc cga cta tgt tat cgc att      720
Tyr Gln His Leu Tyr Leu Leu Lys Cys Thr Arg Leu Cys Tyr Arg Ile
            215                 220                 225

ttg tcc ata aat                                                      732
Leu Ser Ile Asn
        230
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<210> 8

<211> 226

<212> PRT

<213> Castanea sativa

<400> 8

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Met Lys Thr Leu Ala Leu Tyr Gly Leu Thr Leu Ala Phe Phe Phe Leu
1               5                   10                  15

Ser Gly Ala His Ser Ala Lys Ile Thr Phe Thr Asn Asn Cys Pro Arg
            20                  25                  30

Thr Ile Trp Pro Gly Thr Leu Thr Ser Asp Gln Lys Pro Gln Leu Ser
        35                  40                  45

Lys Thr Gly Phe Glu Leu Ala Ser Lys Ala Ser Leu Thr Leu Glu Cys
    50                  55                  60

Ser Ser Ser Met Glu Arg Pro Val Leu Gly Pro Asn Pro Met His His
65                  70                  75                  80

Gln Ile Arg Lys Val His Leu Arg Asp Cys His Arg Ser Gly Cys Met Gln
                85                  90

Trp Arg Cys Asn Pro Thr Ser Phe Phe Ser Arg Asn Gln His Ser Ser Gln
```

```
        100                 105                 110

Ser Trp Asp Gly Leu Leu Pro Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys
115                 120                 125                 130

Ser His Gln Arg Arg His Trp Leu Gln Gly His Lys Leu Ser Ser Cys Glu
            135                 140                 145

Arg Ser Leu Pro Ser Gly Ile Thr Ser Glu Arg Val Trp Glu Arg Ala Cys
    150                 155                 160                 165

Leu Gln Glu Arg Leu Tyr Cys Phe Gln Ser Thr Thr Val Leu Leu His Trp
                170                 175                 180

Cys Ile His Pro Glu Asn Met Ser Thr His Lys Ile Phe Ser His Leu Ala
        185                 190                 195

Thr Met Ser Ser Ser Leu Ser Tyr Gln His Leu Tyr Leu Leu Lys Cys Thr
200                 205                 210                 215

Arg Leu Cys Tyr Arg Ile Leu Ser Ile Asn
            220                 225
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